

**ACTION PLAN  
FOR THE  
SAMPLING AND CHARACTERIZATION  
OF  
ELECTROREFINING SALT RESIDUES**

**PM-018-001  
REVISION A  
NOVEMBER 5, 1993**

**EG&G Rocky Flats, Inc.**

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## I. INTRODUCTION

**Background.** In September 1993, EG&G Rocky Flats, Inc., prepared a report addressing the safety risks associated with the storage of certain types of plutonium-bearing residues (Reference 1). In a subsequent letter to EG&G, DOE-RFO highlighted potential safety issues brought by the Defense Nuclear Facility Safety Board (DNFSB) with regard to the storage and handling of residue drums (Reference 2). In response, EG&G conducted a risk assessment which concluded that the materials in question did not present immediate safety concerns to the public or the workers and reported those results to DOE (Reference 3). However, to confirm the results of the risk assessment, EG&G committed to conduct additional investigatory actions to include the inspection, sampling, and analysis of the residue materials, their packaging, and their containers.

**Purpose and Objective.** The purpose of this Action Plan is to define the activities that will be undertaken to develop a detailed Project Plan for the characterization of stored ER salt residues. The Project Plan will, in turn, define the specific activities that will lead to the generation of data that will support (or refute) the conclusions of the risk assessment described above. Some of the information that will be required in the Project Plan is known to some extent while other information will require additional effort to obtain. The objective of this Action Plan is to: 1) present a thorough list of the information required in the Project Plan, 2) identify the organizations responsible for obtaining that information, 3) develop an initial outline of the Project Plan, and 4) provide estimates of the cost and schedule of completing the Project Plan. The remainder of this Action Plan describes how this information is to be obtained and compiled into a Project Plan.

**Scope.** The specific residue materials that will be investigated are the various forms of electrowinning (ER) salts that are stored in 55-gallon drums, 10-gallon drums, 8801/8802 Vollrath cans, and Stacker/Retriever cans. The various drums/containers are currently located in several of the plutonium operations buildings at Rocky Flats. While this Action Plan and subsequent Project Plan will address only ER salt residues, a follow-on set of plans will be developed that will address similar issues associated with all stored residues at Rocky Flats.

## II. INFORMATION REQUIREMENTS

The data required to prepare the ER salt characterization Project Plan include the following elements of information:

1. What characterization and inspection information is required to determine whether or not the ER salt residues are inherently safe in their current storage configuration?
2. What subset of the current total inventory of ER salts is to be sampled and inspected?
3. How are the sampling, inspection, and analytical operations to be carried out and by whom?

4. What equipment, facilities, and buildings will be used to complete the sampling and inspection program and are they currently available?
5. What equipment and facilities will be required to complete the laboratory analyses of ER salt samples and are they currently available?
6. What are the procedural, programmatic, management, and administrative obstacles that must be overcome to accomplish this task, and what individuals/organizations must be involved in the approval cycle in order to ensure success.

A brief discussion of each of the above issues is included in the following paragraphs.

#### Characterization and Inspection Data Requirements

Both the chemical composition and the physical characteristics of the residue material must be determined. In addition, the integrity of the internal packaging as well as the external containers must be assessed. The complete characterization of the residues and their containment will be established through a program of inspections, sampling, and physical and chemical analyses. A preliminary list of inspection and analytical requirements has already been prepared. This list includes not only the requirements to determine whether or not ER salts and their containers are currently safe, but also includes analyses necessary to provide more complete characterization data anticipated for other purposes, e.g., WIPP certification, RCRA characterization, and residue storage permit compliance. The rationale for including these additional analytical requirements is that, once the containers are opened and the contents sampled, a full spectrum of analyses should be performed to eliminate the need for accessing the containers again at some time in the future.

The types of inspections and analyses that will be required for ER salts include qualitative inspections (drum integrity, container pressurization, IDC verification, etc.), qualitative chemical analyses (to determine the presence of such constituents as reactive metals, peroxides, hydrides, etc.), and quantitative chemical analyses (headspace gas composition, quantities of toxic metals, etc.). A complete list of required inspections and analyses will be compiled, reviewed, and finalized.

#### ER Salt Sample Base

ER salts of some form or another are currently categorized as five separate Item Description Codes (IDCs). They are stored in 55-gallon drums, 10-gallon drums, Stacker/Retriever cans, 8801/8802 Vollrath cans, Vollrath cans inside of 55-gallon drums, and other miscellaneous containers. Storage buildings include Buildings 371, 771, 776, 777, 779. Containers are stored in the Stacker/Retriever, vaults, vault-like rooms, and other residue storage locations. These storage locations include both inert and non-inert atmospheres. The ER salt residues were generated during the period of approximately 1959 through 1989 and, thus, represent a spectrum of the degree of "aging" that has taken place both in terms of the residue material itself as well as its packaging and containment. The salts were generated using both tilt-pour and stationary furnaces, were part of

both development as well as production activities, and have both plastic and metal as the primary internal packaging material.

The potential number of uniquely different groups of ER salt residues will be determined based on the following set of conditions:

- IDC number (five possibilities)
- Type of containment package (four possibilities)
- Type of internal package (two possibilities)
- Storage environment (two possibilities--inert and non-inert)
- Generation environment (two possibilities--R&D and production)
- Generation furnace type (two possibilities)
- Age (perhaps three possibilities)

Thus, there may be as many as 960 different categories of ER salts that must be sampled and characterized. Clearly, the number of samples must be reduced to a more manageable level. As part of the development of the Project Plan, the significant differences between various categories will be evaluated to determine if the number of those categories can be minimized. Potential reductions might be possible if the number of IDCs were limited. Also, it may not be possible to determine the age of the residue or whether it was generated in a development or a production mode or the type of furnace that was used. The use of the "analysis of variance" technique may also allow a reduction in the number of samples taken. A proposal for a sampling plan will be developed and reviewed for its statistical soundness. The requirement is to obtain a statistically significant number of samples from each unique category of salts to ensure adequate representation of that category while keeping the number of samples to the minimum.

#### Sampling, Inspection, and Analytical Procedures

Sampling, inspection, and analysis operations take place routinely at Rocky Flats. The procedures defining how sampling and inspection is to take place will be obtained, reviewed, and adapted to residues. Likewise, the types of analyses that would need to be accomplished are defined either in existing laboratory procedures or in external documents such as EPA SW-846. If there are analyses that are not defined in existing documents, then methodologies will be developed based on standard analytical techniques. The Project Plan will identify what procedures are to be used and where those procedures are to be found. The Project Plan will also identify what Rocky Flats organizations will be tasked to perform the various operations.

#### Sampling and Inspection Equipment, Facilities, and Buildings

One of the primary objectives to be accomplished during the development of the Project Plan is the identification of the building or buildings and the facilities within those buildings that will be used to accomplish the sampling and inspection operations. Buildings 371, 771, and 779 have been proposed as possible venues with Building 779 suggested as the baseline against which other buildings will be compared. Equipment requirements and availability, building and facility condition, and transportation requirements will be included as final selection criteria.

Detailed procedures will be required before residue drums can be moved from their current storage locations, opened, inspected, sampled, and possibly repackaged. Some procedures may already exist as part of previously initiated sampling programs. These procedures, whether existing or to be prepared, will specify the sampling location, the equipment necessary to protect workers while drum containment is breached, and the equipment required to obtain, package, and transport the samples to the appropriate analytical laboratory.

Preparation of the Project Plan will include a review of applicable procedures to determine the facility and equipment requirements necessary to achieve safe and efficient sampling and inspection operations. Equipment and facility requirements will then be compared to the resources currently available to determine if there are any shortfalls. This task will also include an assessment of the operability of existing equipment to determine immediate maintenance requirements.

#### Analytical Equipment and Facilities

To accomplish the spectrum of analyses proposed in this plan, one or more of the Rocky Flats laboratories will be tasked to provide analytical support. The final selection of sample analysis requirements will be reviewed, and a list of the required analytical equipment and instrumentation will be prepared. The appropriate laboratory facilities will also be identified. The equipment requirements will then be compared to the equipment currently available in existing laboratories. If required equipment is either not functional or otherwise unavailable, then plans will be made to repair, replace, or acquire it.

#### Procedural, Programmatic, Management, and Administrative Requirements

In addition to the organizations actually performing the inspection, sampling, and analysis of ER salt residues, there will be other Rocky Flats organizations who will be in a position to prepare, review, revise, or provide approval authority for various documents that define the operation. Requirements imposed by such organizations as Safety, Safeguards and Security, Radiological Engineering, Quality Assurance, NEPA and Ecology, Waste Operations, and the Fire Department will have significant impact on the procedures that must be prepared. The specific organizations having oversight and approval authority as well as the requirements imposed by those organizations will be determined as part of the preparation of the Project Plan. Prerequisites for initiating sampling operations, e.g., safety screens and readiness evaluations, will also be determined. Plans will be made for a readiness evaluation, which must be performed before the project plan is executed.

Funding for this effort must be identified. Residue sampling and characterization activities are included in several existing work packages, but there is no single work package that addresses all of the elements included in this Action Plan, and all requirements identified herein may not exist in any current work package. Applicable work packages will be reviewed, and recommendations for revisions or realignments will be made. Actions by the Plant Change Control Board may be necessary.

The culmination of the efforts to prepare the Project Plan will be the development of a Task Information Package (TIP) or a procedure for this project. The TIP/Procedure will embody all of the

operational and procedural aspects of the sampling program and constitute approval of those operations by each of the cognizant organizations. Final approval of the TIP/Procedure will probably not take place until several months after the preparation of the Project Plan. Therefore, the objective is to have a draft TIP/Procedure prepared in parallel with the preparation of the Project Plan. The initial task to be defined in the Project Plan will be to obtain final approval of the TIP/Procedure. A summary flowchart of the processes leading to the preparation of the Project Plan is given in Figure 1.

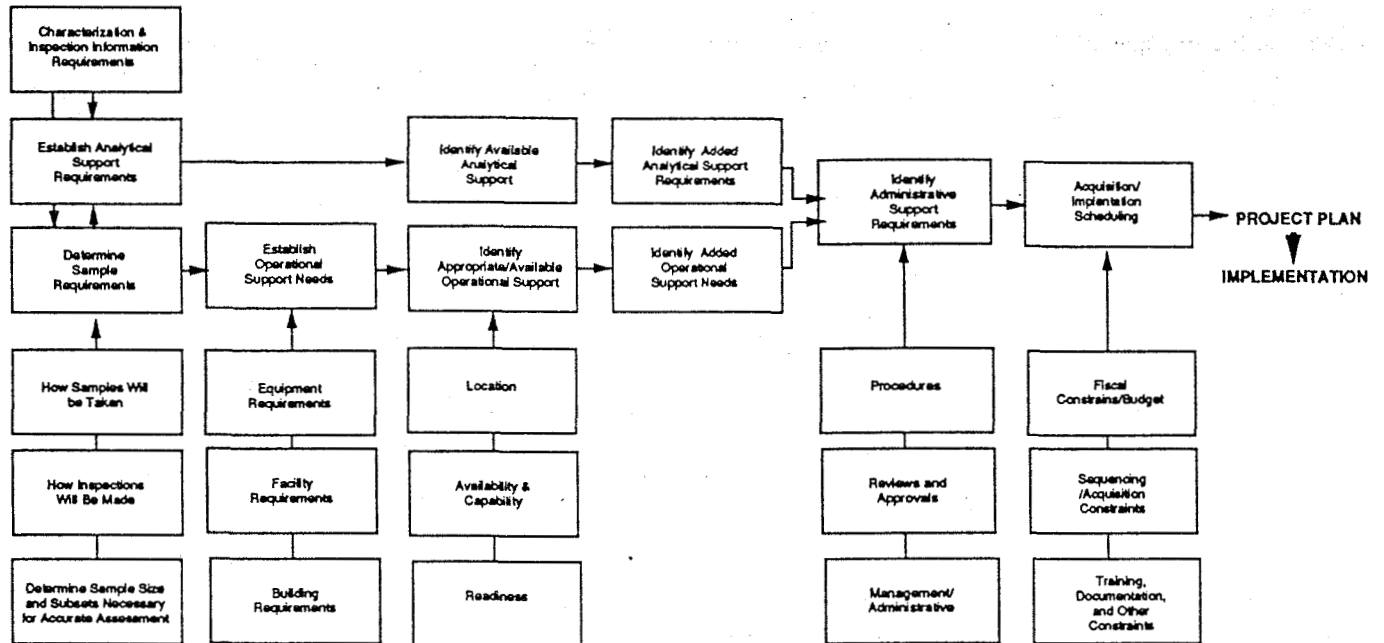


Figure 1. Project Plan Development Flowchart

### III. INFORMATION ACQUISITION

Section II, above, described in general terms the information that will be required to prepare a more detailed Project Plan and a draft TIP/Procedure to characterize ER salt residues. This section identifies the organizations who will be tasked to collect this information. Specific individuals within those organizations who will be ultimately responsible for ensuring that all information needs are met for their particular area of expertise have already been identified. Supporting organizations are identified as well but the list is not all-inclusive since much of the required information will ultimately be provided by subject matter experts throughout the plant.

#### Characterization and Inspection Data Requirements

Primary: Residue Treatment Technology  
 Support: Residue Operations  
 Radiological Waste Programs  
 Waste Identification and Characterization

#### ER Salt Sampling Data Base

Primary: Waste Identification and Characterization  
Support: Waste Assay and Shipping

#### Sampling, Inspection, and Analytical Procedures

Primary: Residue Operations  
Support: Pu Operations Support Laboratory  
Radiological Waste Programs

#### Sampling and Inspection Equipment, Facilities, and Buildings

Primary: Residue Operations  
Support: Radiological Waste Programs

#### Analytical Equipment and Facilities

Primary: Pu Operations Support Laboratory  
Support: TBD

#### Programmatic, Procedural, Administrative, and Management Requirements

Primary: Residue Elimination  
Support: Facilities Management and Operations  
Residue Elimination  
Residue Operations  
Residue Treatment Technology

Two additional tasks that are part of the development of the Project Plan are: 1) the preparation of the actual Project Plan document, and 2) the preparation of the draft TIP/Procedure. Don Dustin (Residue Elimination) will coordinate the preparation of the Project Plan document with input from those persons responsible for obtaining the various elements of information defined above. Responsibility for the preparation of the draft TIP/ Procedure will fall to the Operations Manager of Building 371, 771, or 779, wherever the bulk of the sampling and inspection is to take place. Management oversight of the entire ER characterization project will be provided by Ron Williams (Residue Elimination).

#### **IV. PROPOSED PROJECT PLAN OUTLINE**

The Project Plan for the characterization of ER salt residues will follow the same general format as the "Sampling and Analysis Plan for Pyrochemical Salts" (Reference 3). Integrated into

the Project Plan will be the information that was identified and will be developed as described in Section II, above. The proposed second-level outline for the Project Plan is as follows:

#### PROPOSED PROJECT PLAN OUTLINE

- I. Introduction
  - A. Background
  - B. Purpose and Objectives
  - C. Scope
- II. Characterization Requirements
  - A. Qualitative Inspection
  - B. Qualitative Analyses
  - C. Quantitative Analyses
  - D. Sample Selection Strategy
- III. Equipment and Facility Requirements
  - A. Sampling and Inspection
  - B. Laboratory Analysis
  - C. Availability/Operability Assessment
  - D. Remedial Actions
- IV. Methodology and Procedures
  - A. Container Retrieval and Movement
  - B. Container and Package Inspection
  - C. Container and Package Sampling
  - D. Sample Transfer
  - E. Sample Analysis
  - F. Container Repackaging
  - G. Waste Disposal
- V. Organizational Responsibilities
  - A. Residue Operations
  - B. Waste Identification and Characterization
  - C. Waste Assay and Shipping
  - D. Radiological Waste Programs
  - E. Residue Elimination
  - F. Residue Treatment Technology
  - G. Facilities Management and Operations
  - H. Pu Operations Support Laboratory
  - I. Other Support Organizations
- VI. Data Quality Objectives
- VII. Schedule and Cost



## V. COST AND SCHEDULE

The proposed schedule for the preparation of the ER salt residue characterization Project Plan and the draft TIP/Procedure is shown in Figure 2. The schedule includes four weeks of information acquisition and seven weeks of document preparation leading to issue of the two documents identified as milestones. Two review periods are incorporated into the schedule for the preparation of the final Project Plan whereas only one review period is included for the preparation of the draft TIP/ Procedure. The schedule is based on the assumption that this Action Plan will be approved by EG&G and DOE and receive concurrence from the DNFSB not later than November 19, 1993.

An estimate of the labor requirements for each of the tasks shown in the schedule was made in order to determine a rough-order-of-magnitude cost for the preparation of the Project Plan and the draft TIP/Procedure. The results of that estimate are shown in the following Table.

Task	FTE	Duration (mo.)	Employee-Months
Project Management (Overhead)	0.1	2.0	0.2
Information Acquisition	0.2	1.0	0.2
Characterization Requirements	0.5	0.25	0.12
Sampling Data Base	0.5	0.5	0.25
Operational Procedures	0.5	0.75	0.38
Sampling Inspection Requirements	0.5	0.5	0.25
Analytical Requirements	0.5	0.5	0.25
Programmatic Requirements	1.0	1.0	1.0
Project Plan Preparation			
Overhead	0.5	2.0	1.0
Direct	0.5	2.0	1.0
Draft TIP/Proc. Preparation	2.0	1.5	3.0
Additional General Support (Contingency)			1.0
Total Labor Resource Requirements			
Overhead			1.2
Direct			7.45



Based on an estimate of \$150,000 per employee-year, the anticipated cost of producing a Project Plan and a draft TIP/Procedure is approximately \$108,000 of which \$15,000 will be charged to overhead. The \$93,000 of direct labor expenses exists in FY94 work packages. These work packages will be reviewed to determine the most appropriate source of funding prior to initiation of Project Plan activities.

## VI. REFERENCES

1. W. V. Conner, "Evaluation of Residue Drum Storage Safety Risks," RO-93-002, September 27, 1993.
2. M. N. Silverman ltr (12168) to H. P. Mann, Draft Findings from the Defense Nuclear Facilities Safety Board Staff Visit, Week of September 22, 1993, October 18, 1993.
3. H. P. Mann ltr (93-RF-12968) to M. N. Silverman, Rocky Flats Plant Hazardous Material Storage Issues, Recommended Course of Action, October 20, 1993.
4. Sampling and Analysis Plan for Pyrochemical Salts (DRAFT), 1-10000-EWQA, February 12, 1993.